

Rapid Watershed Assessment

Buffalo-Whitewater

(MN / WI) HUC: 07040003



Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help land-owners and local leaders set priorities and determine the best actions to achieve their goals.

Introduction

The Buffalo-Whitewater 8-Digit Hydrologic Unit Code (HUC) subbasin is located within the Paleozoic Plateau/Coulee and Rochester/Paleozoic Plateau Upland Sections of the Driftless Area Ecoregion of both Minnesota and Wisconsin.

Approximately ninety percent of the 886,448 acres in this HUC are privately owned. The remaining acres are state, federal or conservancy lands or covered by open water.

Assessment estimates indicate 2,430 farms in the watershed. Approximately forty eight percent of the operations are less than 180 acres in size, forty eight percent are from 180 to 1000 acres in size, and the remaining farms are greater than 1000 acres in size.

The main resource concerns in the watershed are sediment and erosion control, stormwater management, drinking and source water protection, animal waste management, nutrient management and wetland management.

Water quality degradation, particularly sedimentation from eroding farmland, is seen by many as a major problem affecting the watershed. In spite of significant successes over the years, the Whitewater river still ranks near the top of U.S. Geological Survey's Minnesota streams with severe erosion and sedimentation problems.



County Totals

County	Acres in HUC	% HUC
Wabasha	93,983	10.6%
Winona	246,468	27.8%
Olmsted	82,894	9.4%
Eau Claire	25,980	2.9%
Pepin	9,136	1.0%
Buffalo	326,138	36.8%
Trempealeau	72,428	8.2%
Jackson - WI	29,463	3.3%
La Crosse	0.5	0.0%
Total acres:	886,448	100%



Physical Description

The Buffalo River begins near Osseo in Trempealeau County Wisconsin at the confluence of its North and South Forks. From Osseo, the Buffalo flows westwardly into Buffalo County, past Strum, Eleva and Mondovi. At Mondovi the river turns southwest for the remainder of its course, converging with the Mississippi River northwest of the town of Alma.

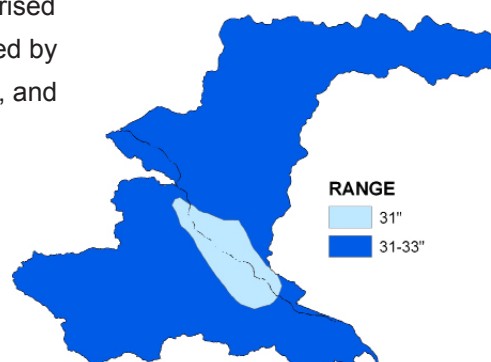
The Whitewater River flows near the Minnesota towns of Altura, Saint Charles and Elba, converging with the Mississippi at Weaver Bottoms, a nationally significant waterfowl staging area that is threatened by the pollutants carried by the river. Significant portions of the Whitewater river in Minnesota are classified as wild or semi-wild trout waters.

The drainage area of the basin is within a geologic region known as the 'Driftless Area', with gently rolling to steeply sloped topography comprised of a unique landform known as 'karst'. Karst features are characterized by numerous underground streams, sinkholes, blind valleys and springs, and are highly susceptible to groundwater contamination.

Precipitation in the Buffalo-Whitewater watershed ranges between 31 and 33 inches each year. Predominate land covers / land uses in the basin are Forest (35.5%), Row Crops (29%), Grass, Pasture & Hay (20.5%), and Residential / Commercial Development (5.7%).

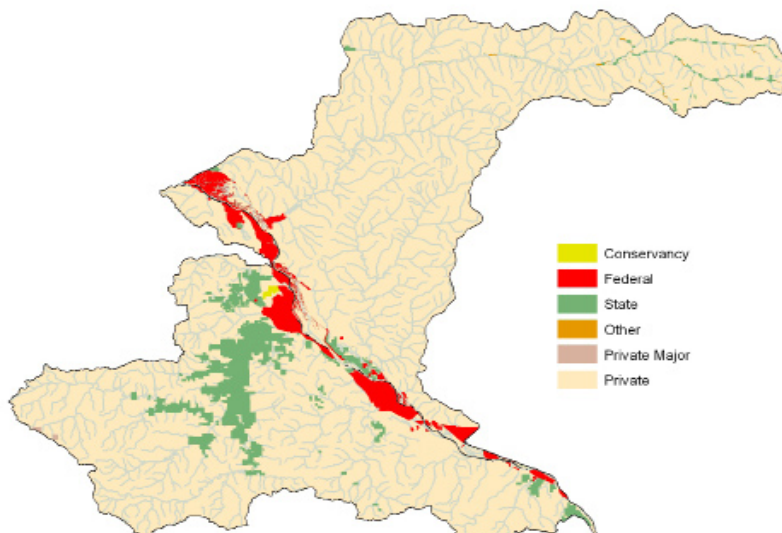


Average Precipitation



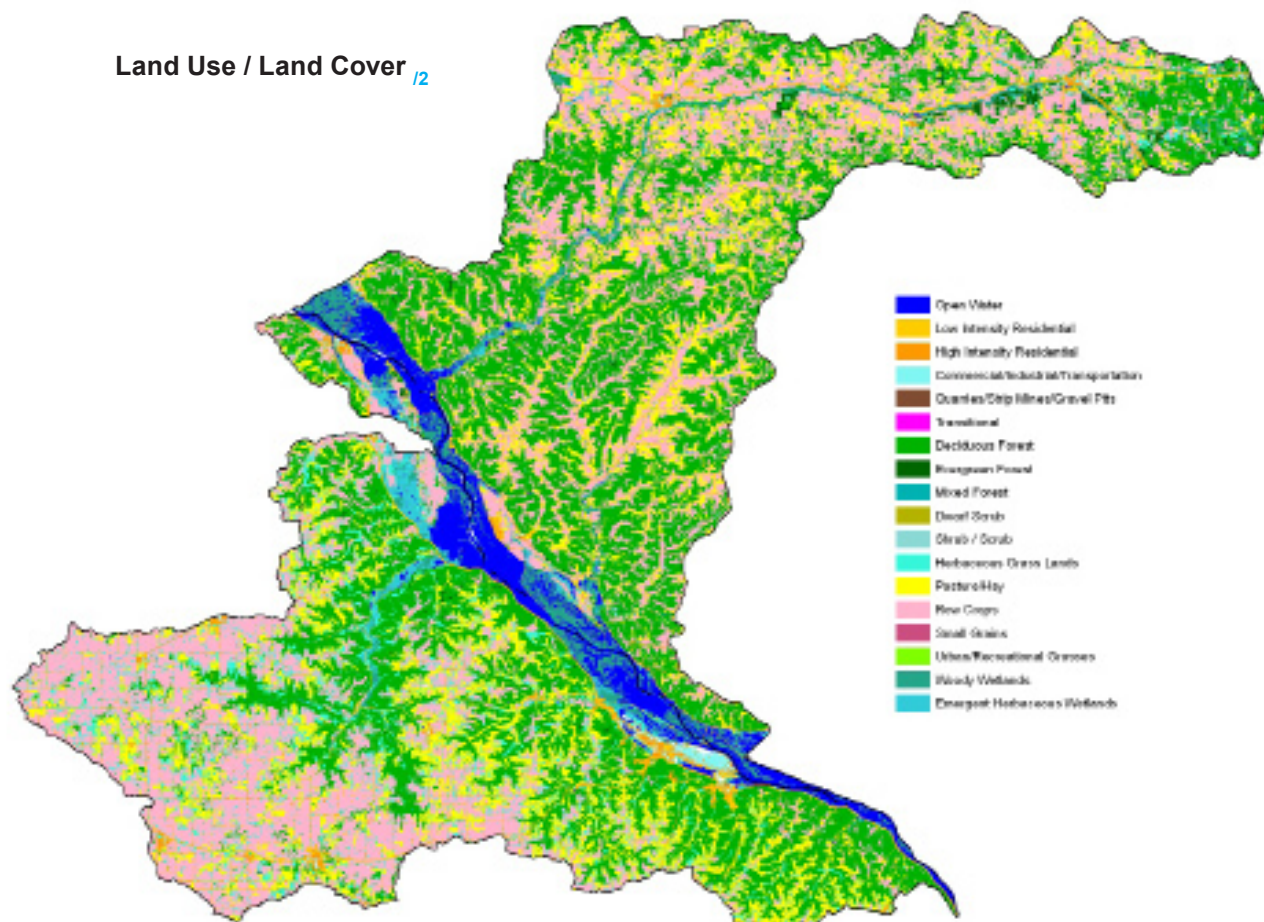
Ownership

Ownership Type	Acres	% of HUC
Conservancy	619	0.1
County	-	-
Federal	41,311	4.7
State	48,292	5.4
Other	537	0.1
Tribal	-	-
Private Major	393	0.0
Private	795,296	89.7
Total Acres:	886,448	100



* Ownership totals derived from 2007 MN DNR GAP Stewardship and Wisconsin GAP Coverage data and are the best suited estimation of land stewardship available on a statewide scale at time of publication. See the bibliography section of this document for further information.

The Buffalo-Whitewater watershed covers an area of 886,448 acres. Approximately ninety percent of the land in the watershed is owned by private landholders (795,296 acres). The second largest ownership type is State, with approximately 48,292 acres (5.4%), followed by Federal with 41,311 acres (4.7%), Conservancy, with approximately 620 acres (0.1%), and miscellaneous “Other Public” lands with 537 acres (0.1%). Private Major Comprises the smallest ownership class, with 393 acres (<0.1). Land Use by ownership type is represented in the table below.



	Public		Private**		Tribal			
Landcover/Use	Acres	% Public	Acres	% Private	Acres	% Tribal	Total Acres	Percent
Forest	30,647	3.5%	284,300	32.1%	0	0.0%	314,947	35.5%
Grass, etc	5,928	0.7%	175,849	19.8%	0	0.0%	181,777	20.5%
Orchards	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Row Crops	2,076	0.2%	256,215	28.9%	0	0.0%	258,291	29.1%
Shrub etc	277	0.0%	6,362	0.7%	0	0.0%	6,639	0.7%
Wetlands	18,670	2.1%	18,037	2.0%	0	0.0%	36,707	4.1%
Residential/Commercial	2,064	0.2%	48,514	5.5%	0	0.0%	50,579	5.7%
Open Water*	18,435	2.1%	19,044	2.1%	0	0.0%	37,479	4.2%
* ownership undetermined			** includes private-major					
Watershed Totals:	78,097	8.81%	808,322	91.2%	0	0.0%	886,448	100%

Physical Description (continued)

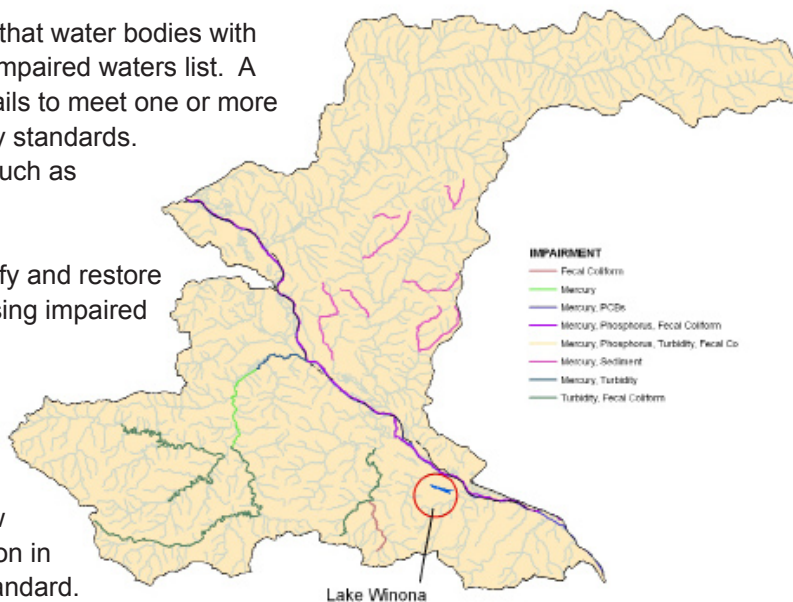
		ACRES	cu. ft/sec	
Stream Flow Data	USGS 05378500 MISSISSIPPI RIVER AT WINONA, MN	2006 Total Avg.	33,020	
		May – Sept. 2007 Avg.	18,830	
Stream Data ¹⁴ (*Percent of Total HUC Stream Miles)		ACRES/MILES	PERCENT	
	Total Miles – Major (100K Hydro GIS Layer)	2,052	---	
	303d/TMDL Listed Streams (DEQ)	249.8	12.2%	
Riparian Land Cover/Land Use ¹⁵ (Based on a 100-foot buffer on both sides of all streams in the 100K Hydro GIS Layer)	Forest	15,432	31.4%	
	Grain Crops	0	0.0%	
	Grass, etc	9,548	19.5%	
	Orchards	0	0.0%	
	Row Crops	11,628	23.7%	
	Shrub etc	360	0.7%	
	Wetlands	5,069	10.3%	
	Residential/Commercial	2,645	5.4%	
	Open Water	4,396	9.0%	
	Total Buffer Acres:	49,079	100%	
Crop and Pastureland Land Capability Class ¹⁶ (Croplands & Pasturelands Only) (1997 NRI Estimates for Non-Federal Lands Only)	1 – slight limitations	7,500	4%	
	2 – moderate limitations	117,200	57%	
	3 – severe limitations	45,900	22%	
	4 – very severe limitations	20,800	10%	
	5 – no erosion hazard, but other limitations	2,600	1%	
	6 – severe limitations; unsuitable for cultivation; limited to pasture, range, forest	6,800	3%	
	7 – very severe limitations; unsuitable for cultivation; limited to grazing, forest, wildlife habitat	5,900	3%	
	8 – miscellaneous areas; limited to recreation, wildlife habitat, water supply	600	0%	
	Total Croplands & Pasturelands	207,300	-	
	TYPE OF LAND	ACRES	% of Crop Lands	% of HUC
Irrigated Lands ¹⁷ (1997 NRI Estimates for Non-Federal Lands Only)	Cultivated Cropland / Pastureland	0	0%	0%
	Uncultivated Cropland	0	0%	0%
	Total Irrigated Lands	0	0%	0%

Assessment of Waters

Section 303(d) of the Clean Water Act states that water bodies with impaired use(s) must be placed on a state's impaired waters list. A water body is "Impaired" or polluted when it fails to meet one or more of the Federal Clean Water Act's water quality standards. Federal Standards exist for basic pollutants such as sediment, bacteria, nutrients, and mercury.

The Clean Water Act requires States to identify and restore impaired waters. The primary tool for addressing impaired waters is a pollution reduction plan called a Total Maximum Daily Load, or TMDL.

After impaired use(s) have been identified, the TMDL process identifies all sources of each pollutant. The plan then determines how much each source must reduce its contribution in order to meet the applicable water quality standard.



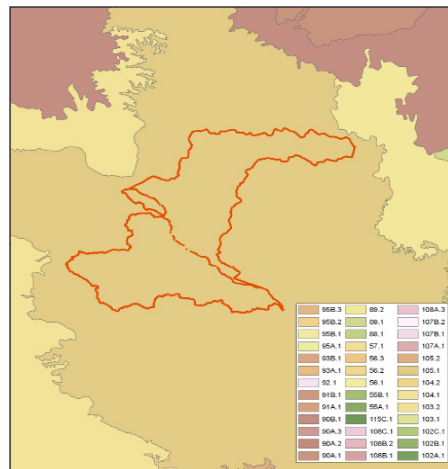
2006 TMDL Listed Waters - Buffalo-Whitewater Watershed^{1/8}

Listed Stream	Impairment	Affected Use
Unnamed Creek	Mercury, Sediment	Aquatic Life and Aquatic Consumption
Mississippi River	Mercury, PCBs	Aquatic Life and Aquatic Consumption
Eagle Creek	Mercury, Sediment	Aquatic Life and Aquatic Consumption
Stockton Valley Creek; Trout Stream Portion To Gar	Fecal Coliform	Aquatic Recreation
Logan Branch; End Trout Stream Portion To North Fk	Turbidity, Fecal Coliform	Aquatic Life and Aquatic Recreation
Whitewater River, South Fork; Whitewater R To Trou	Turbidity, Fecal Coliform	Aquatic Life and Aquatic Recreation
Whitewater R, Middle Fk; Trout Stream Portion	Turbidity, Fecal Coliform	Aquatic Life and Aquatic Recreation
Mississippi River; Chippewa R (Wi) To Huc Boundary	Mercury, Phosphorus, Fecal Coliform	Aquatic Recreation and Aquatic Consumption
Zumbro River; West Indian Cr To Mississippi R	Mercury, Phosphorus, Turbidity, Fecal Co	Aquatic Life, Aquatic Recreation, Aquatic Consumption
Whitewater River; End Trout Stream Portion To Miss	Mercury, Turbidity	Aquatic Life and Aquatic Consumption
Whitewater River; Beaver Cr To End Trout Stream Po	Mercury	Aquatic Consumption
Whitewater River; South Fk Whitewater R To Beaver	Mercury	Aquatic Consumption
Whitewater River; End Trout Stream Portion To Miss	Mercury, Turbidity	Aquatic Life and Aquatic Consumption
Whitewater River; End Trout Stream Portion To Miss	Mercury, Turbidity	Aquatic Life and Aquatic Consumption
Garvin Brook; Class 1B,2A,3B Portion	Turbidity, Fecal Coliform	Aquatic Life and Aquatic Recreation
Whitewater River, North Fk ; Unnamed Cr To Mid Fk	Turbidity, Fecal Coliform	Aquatic Life and Aquatic Recreation
Whitewater River, North Fk ; Unnamed Cr To Unnamed	Turbidity, Fecal Coliform	Aquatic Life and Aquatic Recreation
Whitewater River, South Fork; Headwaters To Trout	Turbidity, Fecal Coliform	Aquatic Life and Aquatic Recreation
Whitewater River, South Fork; Whitewater R To Trou	Turbidity, Fecal Coliform	Aquatic Life and Aquatic Recreation
Whitewater R, Middle Fk; Trout Stream Portion	Turbidity, Fecal Coliform	Aquatic Life and Aquatic Recreation
Whitewater River, North Fk ; Unnamed Cr To Unnamed	Turbidity, Fecal Coliform	Aquatic Life and Aquatic Recreation
Stockton Valley Creek; Trout Stream Portion To Gar	Fecal Coliform	Aquatic Recreation
Mississippi River; Chippewa R (Wi) To Huc Boundary	Mercury, Phosphorus, Fecal Coliform	Aquatic Recreation and Aquatic Consumption
Whitewater River; End Trout Stream Portion To Miss	Mercury, Turbidity	Aquatic Life and Aquatic Consumption
Mississippi River; Chippewa R (Wi) To Huc Boundary	Mercury, Phosphorus, Fecal Coliform	Aquatic Recreation and Aquatic Consumption
Lake Winona	Mercury	Aquatic Consumption

Common Resource Areas

Buffalo-Whitewater encompasses a single common resource area, CRA 105.1, Driftless Loess Hills and Bedrock.

105.1 Driftless Loess Hills and Bedrock: Highly dissected hills and valleys. Well drained and moderately well drained silty soils over bedrock residuum. Predominantly cropland and grazing land on ridge tops and valley bottoms with a mix of dairy, beef and cash grain agricultural enterprises. Deciduous forest on steep side slopes. Primary resource concerns are cropland soil erosion, surface water quality, grazing land and forestland productivity, stream bank erosion, and erosion during timber harvest.



Geology / Soils

Soils in the basin are classified as Alfisols and mapped in the Seaton-NewGlarus-Palsgrove and Lacrescent-Lamoille soil associations (Lueth, 1994). The Seaton-NewGlarus-Palsgrove soils are well-drained silt loams developed in loess on the upland areas of the basin. A typical soil profile has a surface layer of grayish-brown silt loam that is 20 cm thick overlying a subsoil of dark yellowish-brown silt loam that extends to a depth of 150 cm. The soils generally have pH values between 5.1 and 7.3 and an organic-matter content of less than 3 percent in the upper 20 cm (McCleary and others, 1989). Soils in the Lacrescent-Lamoille series develop in loess and colluvium on steep-sided slopes along the drainages and consist of well-drained silt loams that contain between 20 and 60 percent cobbles and gravel.

Bedrock in the basin consists of gently dipping marine sedimentary rocks of Paleozoic age. The uplands plateau surface is capped by the resistant limestones of the Galena Formation and dolomite beds belonging to the Prairie du Chien Group of Paleozoic age (Mossler and Book, 1984). The softer shales and sandstones of the Decorah Shale, Platteville Formation, Glenwood Formation, St. Peter Sandstone, and Jordan Sandstone of Paleozoic age primarily crop out along the walls of the stream valleys (Mossler and Book, 1984). The Prairie du Chien Group and the Jordan Sandstone form the Prairie du Chien aquifer, which is the major water supply in the southeastern corner of Minnesota (Smith and Nemetz, 1996). The bedrock, particularly in the upland areas of the basin, is covered by till deposits of Pleistocene age.

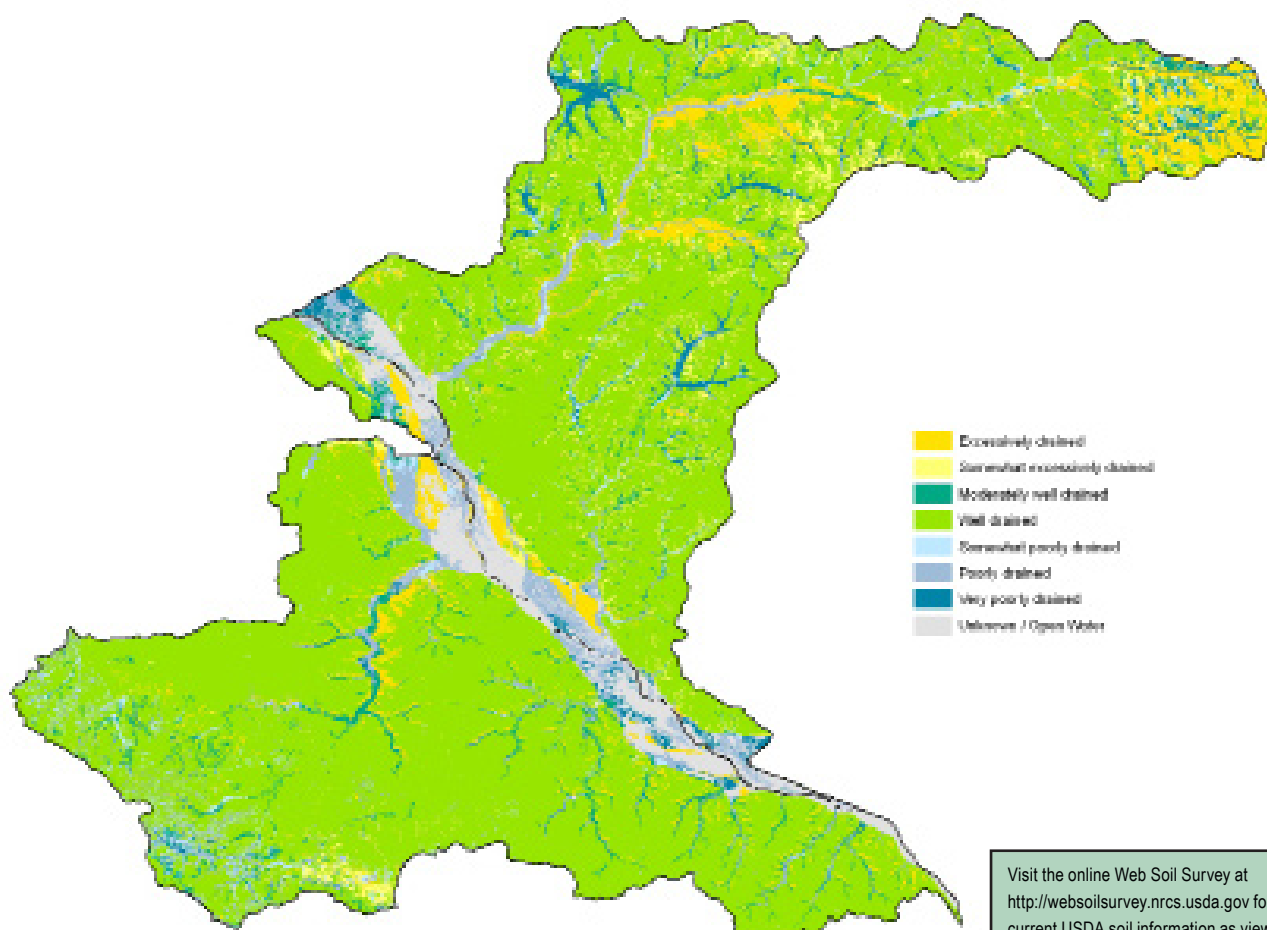
The till consists of a mixture of sand, silt, and clay that is calcareous where unweathered. A thin layer of loess mantles the till and the bedrock and ranges in thickness to as much as 3 m (Hobbs, 1988). The loess consists of a brownish silt loam that is leached of carbonate to a depth of 2 to 3 m. The steep walls along the stream channels are mantled by unsorted colluvium consisting of clasts of bedrock in a silt matrix derived from loess (Hobbs, 1984).

Visit the online Web Soil Survey at <http://websoilsurvey.nrcs.usda.gov> for official and current USDA soil information as viewable maps and tables. Visit the Soil Data Mart at soildatamart.usda.gov download SSURGO certified soil tabular /spatial data.

Drainage Classification

Drainage class (natural) refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil.

Seven classes of natural soil drainage are recognized—excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the “Soil Survey Manual.”



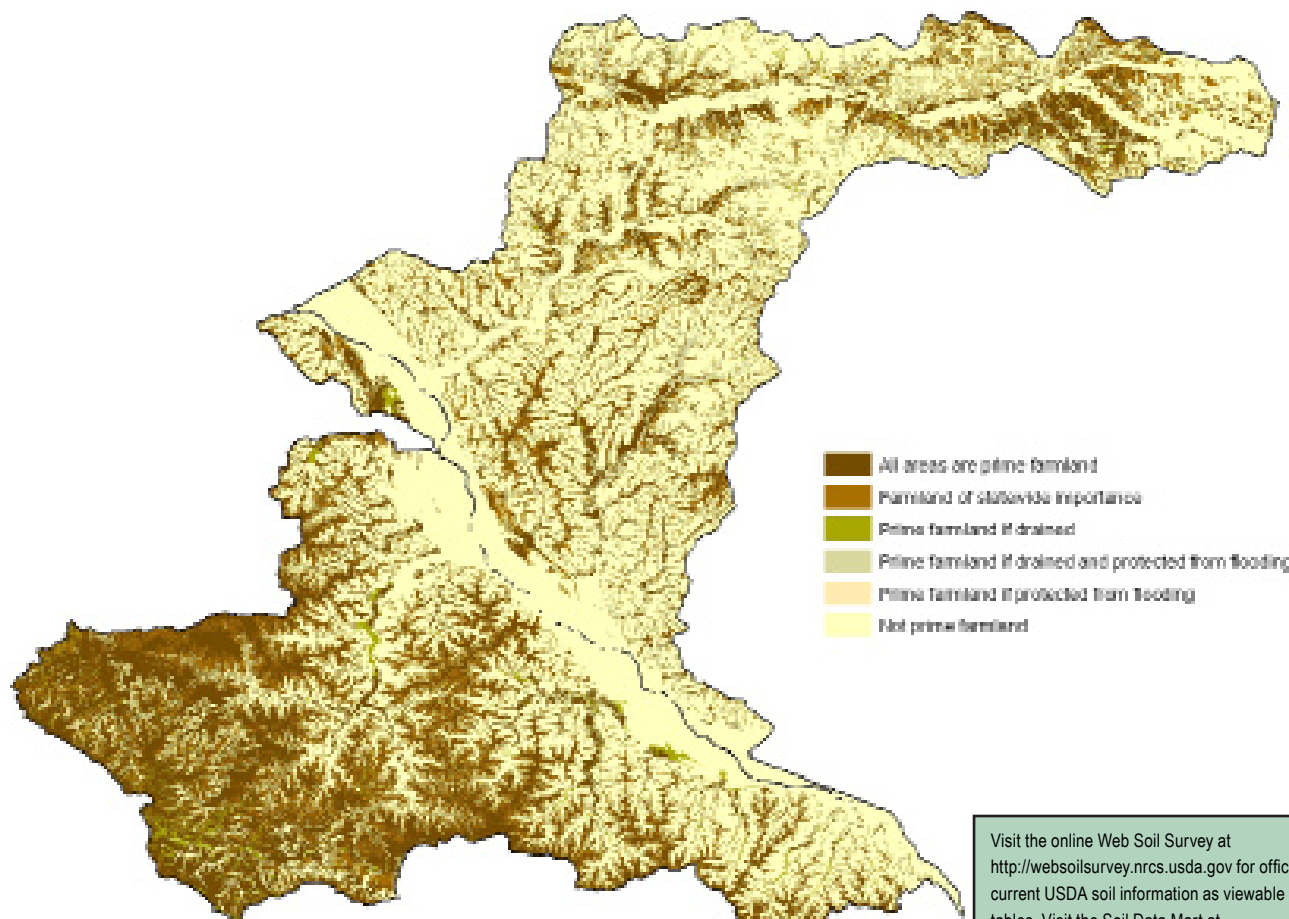
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Farmland Classification

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland.

Farmland classification identifies the location and extent of the most suitable land for producing food, feed, fiber, forage, and oilseed crops.

NRCS policy and procedures on prime and unique farmlands are published in the Federal Register, Vol. 43, No 21, January 31, 1978.

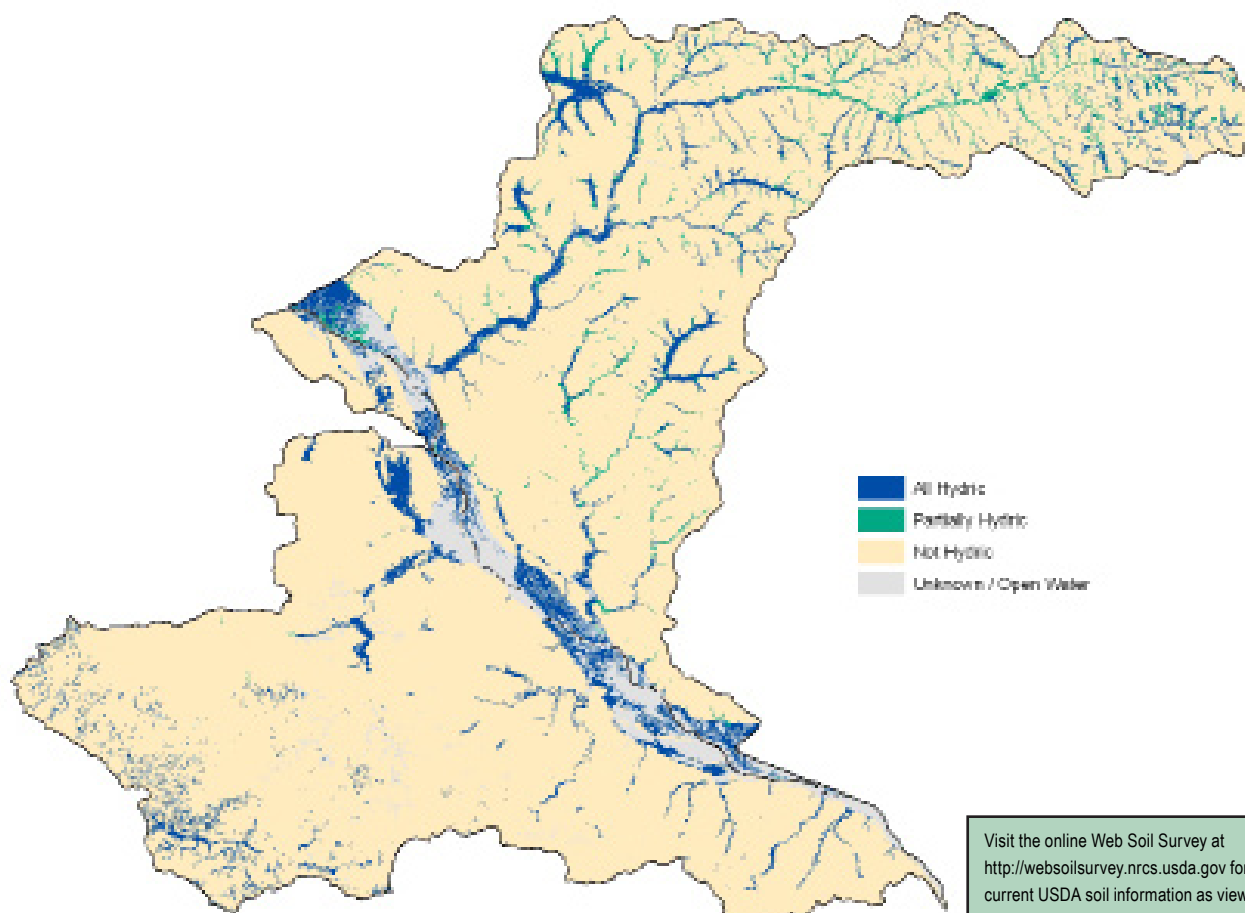


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Hydric Soils

This rating provides an indication of the proportion of the map unit that meets criteria for hydric soils. Map units that are dominantly made up of hydric soils may have small areas, or inclusions of nonhydric soils in the higher positions on the landform. Map units of dominantly non-hydric soils may therefore have inclusions of hydric soils in the lower positions on the landform.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as “soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part” (Federal Register 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

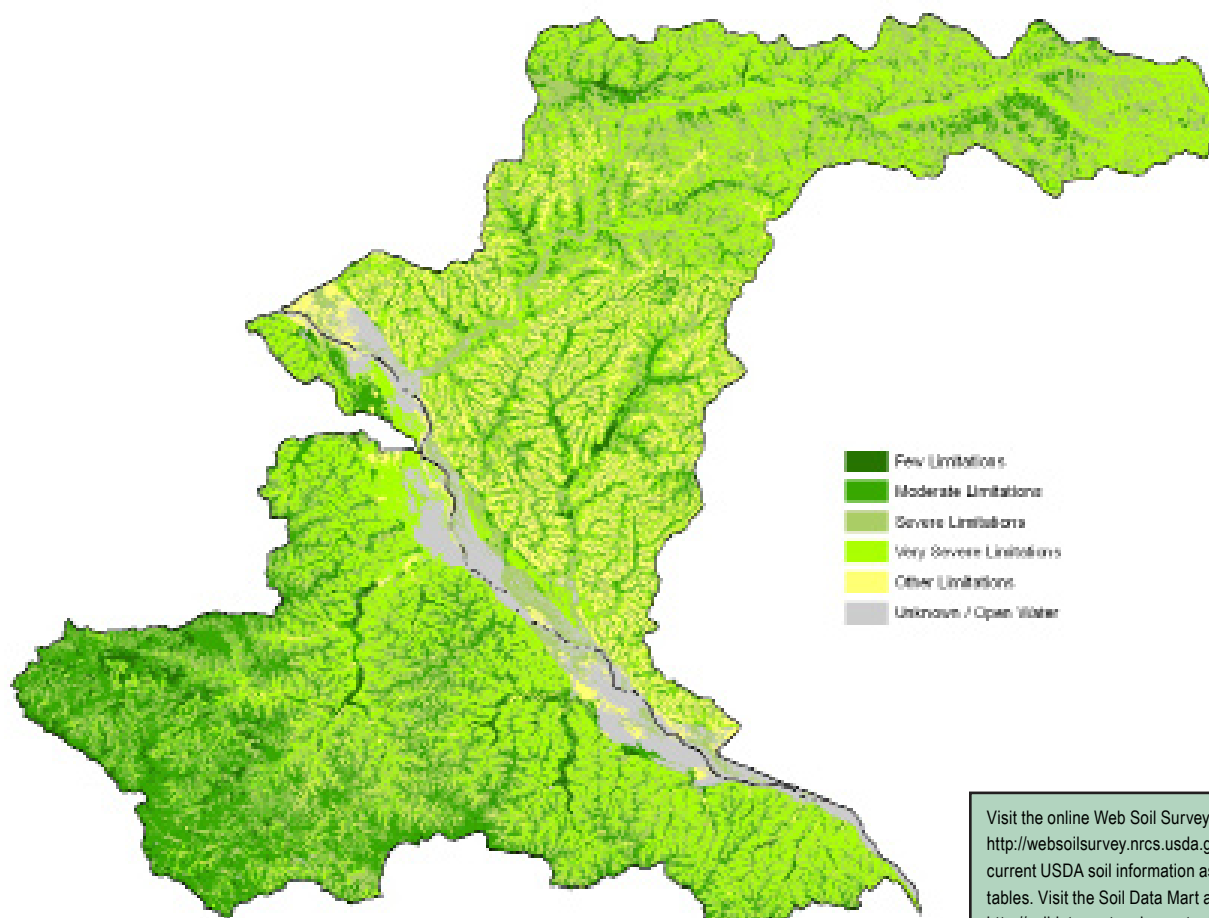


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Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management.

The criteria used in grouping the soils does not include major and generally expensive land forming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.



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Performance Results System Data

PRS Performance Measures	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	MN & WI TOTALS
Total Conservation Systems Planned (acres)	3,997	14,123	5,945	19,264	19,651	N/A	14,948	21,916	10,003	109,847
Total Conservation Systems Applied (acres)	3,065	10,258	3,693	15,933	17,128	N/A	12,256	13,046	8,851	84,230
Conservation Practices										
Total Waste Management (313) (numbers)	3	0	5	0	2	0	1	2	0	13
Riparian Forest Buffers (391) (acres)	19	190	57	196	164	21	85	0	16	748
Erosion Control Total Soil Saved (tons/year)	2,425	149,332	40,735	33,977	33,985	N/A	N/A	N/A	N/A	260,454
Total Nutrient Management (590) (Acres)	500	4,198	3,262	3,119	3,038	2,207	320	2,619	1,541	20,804
Pest Management Systems Applied (595A) (Acres)	0	3,218	2,735	1,934	1,891	472	42	0	81	10,373
Prescribed Grazing 528a (acres)	713	465	634	1,257	2,384	1,616	1,356	115	289	8,829
Tree & Shrub Establishment (612) (acres)	42	514	529	286	349	338	40	151	270	2,519
Residue Management (329A-C) (acres)	307	2,842	382	6,590	4,047	2,027	7,087	5,781	1,007	30,070
Total Wildlife Habitat (644 - 645) (acres)	2,550	5,075	1,407	712	3,061	817	619	2,246	2,340	18,827
Total Wetlands Created, Restored, or Enhanced (acres)	0	455	1	7	0	0	25	0	0	488
Acres enrolled in Farmbill Programs										
Conservation Reserve Program	1,890	4,948	2,286	3,726	2,806	N/A	414	1,567	2,078	19,715
Wetlands Reserve Program	0	0	0	3	0	N/A	0	0	0	3
Environmental Quality Incentives Program	6	3,972	2,279	4,181	4,125	N/A	2,590	5,011	4,115	26,279
Wildlife Habitat Incentive Program	60	40	0	15	54	N/A	20	120	0	309
Farmland Protection Program	0	0	0	0	0	N/A	425	0	0	425

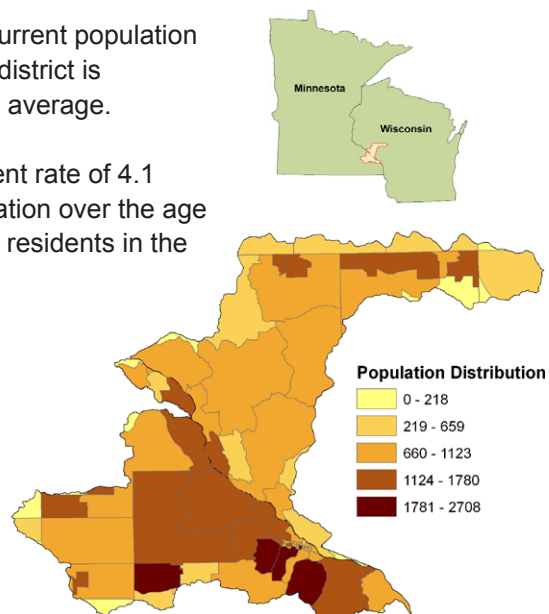
Socioeconomic and Agricultural Data (Relevant)

Estimations for the Buffalo-Whitewater subbasin indicate a current population of 73,116 people. Median household income throughout the district is approximately \$40,268 annually, roughly 87% of the national average.

Unemployment figures for the basin indicate an unemployment rate of 4.1 percent. Census data shows sixty eight percent of the population over the age of 18 is active in the workforce, and approximately 9% of the residents in the watershed are living below the national poverty level.

Assessment estimates indicate 2,430 farms in the watershed. Approximately forty eight percent of the operations are less than 180 acres in size, forty eight percent are from 180 to 1000 acres in size, and the remaining farms are greater than 1000 acres in size.

Of the 2,489 Operators in the Basin, sixty three percent are full time producers not reliant on off-farm income.



(MN) HUC# 7040003		Total Acres:	886,448
Population Data *	Watershed Population	73,116	
	Unemployment Rate	4.1%	
	Median Household Income	40,268	
	% below poverty level	9%	
	Median Value of Home	91,844	
Farms	# of Farms	2,430	
	# of Operators	2,489	Percent
	# of Full Time Operators	1,579	63%
	# of Part Time Operators	910	37%
	Total Crop/Pasturelands:	207,300	23.4%
Farm Size	1 to 179 Acres	966	48%
	180 to 499 Acres	759	38%
	500 to 999 Acres	207	10%
	1,000 Acres or more	78	4%
Livestock & Poultry (Number)	Cattle - Beef	14,408	0%
	Cattle - Dairy	43,527	1%
	Chicken	2,015,365	45%
	Swine	46,995	1%
	Turkey	132,909	3%
	Other	2,260,692	50%
	Animal Count Total:	4,513,897	
	Total Permitted AFOs (MN):	814	

* Adjusted by percent of HUC in the county or by percent of block group area in the HUC, depending on the level of data available

THREATENED AND ENDANGERED SPECIES ¹⁴

NRCS assists in the conservation of threatened and endangered species and avoids or prevents activities detrimental to such species. NRCS' concern for these species includes the species listed by the Secretary of the Interior (as published in the Federal Register) and species designated by state agencies. The following is a list of threatened, endangered, and candidate species as well as species of special concern that occur in the Minnesota portion of the subbasin.



Scientific Name	Common Name	Type	Scientific Name	Common Name	Type
<i>Acipenser fulvescens</i>	Lake Sturgeon	Zoological	<i>Carex laevis</i>	Smooth-sheathed Sedge	Botanical
<i>Actinonaias ligamentina</i>	Mucket	Zoological	<i>Carex laxiculmis</i>	Spreading Sedge	Botanical
<i>Adoxa moschatellina</i>	Moschatel	Botanical	<i>Carex plantaginea</i>	Plantain-leaved Sedge	Botanical
<i>Agalinis gattereri</i>	Round-stemmed False Foxglove	Botanical	<i>Carex sterilis</i>	Sterile Sedge	Botanical
<i>Alasmodonta marginata</i>	Elktoe	Zoological	<i>Carex typhina</i>	Cattail Sedge	Botanical
<i>Allium cernuum</i>	Nodding Wild Onion	Botanical	<i>Carex woodii</i>	Wood's Sedge	Botanical
<i>Alosa chrysochloris</i>	Skipjack Herring	Zoological	<i>Cheilanthes lanosa</i>	Hairy Lip-fern	Botanical
<i>Ammocrypta asprella</i>	Crystal Darter	Zoological	<i>Cicindela patruela patruela</i>	Northern Barrens Tiger Beetle	Zoological
<i>Ammodramus henslowii</i>	Henslow's Sparrow	Zoological	<i>Cicindela splendida cyanocephala</i>	Splendid Tiger Beetle	Zoological
<i>Apalone mutica</i>	Smooth Softshell	Zoological	<i>Cirsium hillii</i>	Hill's Thistle	Botanical
<i>Aphredoderus sayanus</i>	Pirate Perch	Zoological	<i>Clemmys insculpta</i>	Wood Turtle	Zoological
<i>Arcidens confragosus</i>	Rock Pocketbook	Zoological	<i>Coluber constrictor</i>	Eastern Racer	Zoological
<i>Aristida tuberculosa</i>	Sea-beach Needlegrass	Botanical	<i>Crotalus horridus</i>	Timber Rattlesnake	Zoological
<i>Asclepias amplexicaulis</i>	Clasping Milkweed	Botanical	<i>Cycleptus elongatus</i>	Blue Sucker	Zoological
<i>Asplenium platyneuron</i>	Ebony Spleenwort	Botanical	<i>Cyclonaias tuberculata</i>	Purple Wartyback	Zoological
<i>Aster shortii</i>	Short's Aster	Botanical	<i>Cypripedium candidum</i>	Small White Lady's-slipper	Botanical
<i>Atrytone arogos</i>	Arogos Skipper	Zoological	<i>Dendroica cerulea</i>	Cerulean Warbler	Zoological
<i>Aureolaria pedicularia</i>	Fernleaf False Foxglove	Botanical	<i>Dicentra canadensis</i>	Squirrel-corn	Botanical
<i>Baptisia alba</i>	White Wild Indigo	Botanical	<i>Diplazium pycnocarpon</i>	Narrow-leaved Spleenwort	Botanical
<i>Baptisia bracteata</i> var. <i>leucophaea</i>	Plains Wild Indigo	Botanical	<i>Dryopteris goldiana</i>	Goldie's Fern	Botanical
<i>Botrychium campestre</i>	Prairie Moonwort	Botanical	<i>Ellipsaria lineolata</i>	Butterfly	Zoological
<i>Botrychium oneidense</i>	Blunt-lobed Grapefern	Botanical	<i>Elliptio crassidens</i>	Elephant-ear	Zoological
<i>Bryoxiphium norvegicum</i>	Sword Moss	Botanical	<i>Elliptio dilatata</i>	Spike	Zoological
<i>Buellia nigra</i>	A Species of Lichen	Botanical	<i>Empidonax virescens</i>	Acadian Flycatcher	Zoological
<i>Buteo lineatus</i>	Red-shouldered Hawk	Zoological	<i>Emydoidea blandingii</i>	Blanding's Turtle	Zoological
<i>Cacalia suaveolens</i>	Sweet-smelling Indian-plantain	Botanical	<i>Eryngium yuccifolium</i>	Rattlesnake-master	Botanical
<i>Carex annectens</i>	Yellow-fruited Sedge	Botanical	<i>Erynnis persius</i>	Persius Duskywing	Zoological
<i>Carex careyana</i>	Carey's Sedge	Botanical	<i>Eupatorium sessilifolium</i>	Upland Boneset	Botanical
<i>Carex crus-corvi</i>	Raven's Foot Sedge	Botanical	<i>Falco peregrinus</i>	Peregrine Falcon	Zoological
<i>Carex davisii</i>	Davis' Sedge	Botanical	<i>Floerkea proserpinacoides</i>	False Mermaid	Botanical
<i>Carex jamesii</i>	James' Sedge	Botanical	<i>Fusconaia ebena</i>	Ebonyshell	Zoological

THREATENED AND ENDANGERED SPECIES (CONT.)¹⁴

NRCS assists in the conservation of threatened and endangered species and avoids or prevents activities detrimental to such species. NRCS' concern for these species includes the species listed by the Secretary of the Interior (as published in the Federal Register) and species designated by state agencies. The following is a list of threatened, endangered, and candidate species as well as species of special concern that occur in the Minnesota portion of the subbasin.



Scientific Name	Common Name	Type	Scientific Name	Common Name	Type
<i>Gallinula chloropus</i>	Common Moorhen	Zoological	<i>Pituophis catenifer</i>	Gopher Snake	Zoological
<i>Haliaeetus leucocephalus</i>	Bald Eagle	Zoological	<i>Plethobasus cyphus</i>	Sheepnose	Zoological
<i>Hamamelis virginiana</i>	Witch-hazel	Botanical	<i>Pleurobema coccineum</i>	Round Pigtoe	Zoological
<i>Hesperia ottoe</i>	Ottoe Skipper	Zoological	<i>Poa wolfii</i>	Wolf's Bluegrass	Botanical
<i>Heterodon nasicus</i>	Western Hognose Snake	Zoological	<i>Polygala cruciata</i>	Cross-leaved Milkwort	Botanical
<i>Hudsonia tomentosa</i>	Beach-heather	Botanical	<i>Polyodon spathula</i>	Paddlefish	Zoological
<i>Huperzia porophila</i>	Rock Clubmoss	Botanical	<i>Polystichum acrostichoides</i>	Christmas Fern	Botanical
<i>Hydrastis canadensis</i>	Golden-seal	Botanical	<i>Quadrula metanevra</i>	Monkeyface	Zoological
<i>Ictiobus niger</i>	Black Buffalo	Zoological	<i>Quadrula nodulata</i>	Wartyback	Zoological
<i>Jeffersonia diphylla</i>	Twinleaf	Botanical	<i>Ruppia maritima</i>	Widgeon-grass	Botanical
<i>Juniperus horizontalis</i>	Creeping Juniper	Botanical	<i>Sanicula trifoliata</i>	Beaked Snakeroot	Botanical
<i>Leersia lenticularis</i>	Catchfly Grass	Botanical	<i>Sassacus papenhoei</i>	A Jumping Spider	Zoological
<i>Ligumia recta</i>	Black Sandshell	Zoological	<i>Scutellaria ovata</i>	Ovate-leaved Skullcap	Botanical
<i>Megalania nervosa</i>	Washboard	Zoological	<i>Sedum integrifolium</i> ssp. <i>leedyi</i>	Leedy's Roseroot	Botanical
<i>Metaphidippus arizonensis</i>	A Jumping Spider	Zoological	<i>Seiurus motacilla</i>	Louisiana Waterthrush	Zoological
<i>Microtus ochrogaster</i>	Prairie Vole	Zoological	<i>Silene nivea</i>	Snowy Campion	Botanical
<i>Microtus pinetorum</i>	Woodland Vole	Zoological	<i>Solidago sciaphila</i>	Cliff Goldenrod	Botanical
<i>Montia chamissoi</i>	Montia	Botanical	<i>Speyeria idalia</i>	Regal Fritillary	Zoological
<i>Morone mississippiensis</i>	Yellow Bass	Zoological	<i>Sterna forsteri</i>	Forster's Tern	Zoological
<i>Myotis septentrionalis</i>	Northern Myotis	Zoological	<i>Sullivantia sullivantii</i>	Reniform Sullivantia	Botanical
<i>Napaea dioica</i>	Glade Mallow	Botanical	<i>Talinum rugospermum</i>	Rough-seeded Fameflower	Botanical
<i>Notropis amnis</i>	Pallid Shiner	Zoological	<i>Tephrosia virginiana</i>	Goat's-rue	Botanical
<i>Obovaria olivaria</i>	Hickorynut	Zoological	<i>Trillium nivale</i>	Snow Trillium	Botanical
<i>Oenothera rhombipetala</i>	Rhombic-petaled Evening Primrose	Botanical	<i>Triplasis purpurea</i>	Purple Sand-grass	Botanical
<i>Orobanche uniflora</i>	One-flowered Broomrape	Botanical	<i>Tritogonia verrucosa</i>	Pistolgrip	Zoological
<i>Panax quinquefolius</i>	American Ginseng	Botanical	<i>Valeriana edulis</i> ssp. <i>ciliata</i>	Valerian	Botanical
<i>Pellaea atropurpurea</i>	Purple Cliff-brake	Botanical	<i>Vertigo meramecensis</i>	Bluff Vertigo	Zoological
<i>Perognathus flavescens</i>	Plains Pocket Mouse	Zoological	<i>Viola lanceolata</i>	Lance-leaved Violet	Botanical
<i>Phegopteris hexagonoptera</i>	Broad Beech-fern	Botanical	<i>Vitis aestivalis</i>	Silverleaf Grape	Botanical
<i>Phidippus apacheanus</i>	A Jumping Spider	Zoological	<i>Wilsonia citrina</i>	Hooded Warbler	Zoological
<i>Pipistrellus subflavus</i>	Eastern Pipistrelle	Zoological			

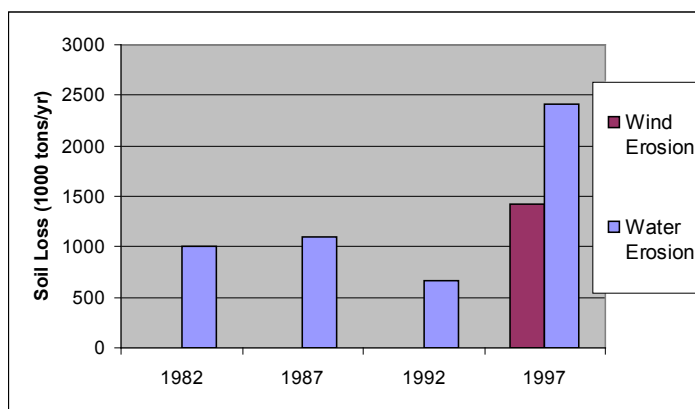
RESOURCE CONCERNS

County Soil and Water Conservation Districts in the watershed have identified the following resource concerns as top priorities for conservation and cost sharing efforts:

- Sediment and Erosion Control.** Excessive amounts of suspended solids from cropland, urban lands, streambanks and streambeds is a primary threat to area waters. Working hand-in-hand with stormwater pollution and prevention plans and nutrient management plans, counties in the watershed seek to retain water on the landscape to reduce flooding and subsequent soil erosion, and improve water resources.
- Stormwater Management.** Local districts recognize that stormwater runoff volume from impervious surfaces will likely increase as development of the watershed continues. Existing stormwater systems typically bypass treatment plants and discharge storm water directly into sinkholes and streams
- Drinking Water and Source Water Protection.** Parts of the region are particularly susceptible to groundwater contamination. Ease of infiltration, aging septic systems, abandoned wells and historical tiling practices threaten public drinking water supplies.
- Feedlot and Animal Waste Management.** Managing farms to minimize excess nutrients, pathogens, and odors released into the environment is important to the health of surface and ground water. Setback of open tile intakes and placement of agricultural waste systems in high priority riparian areas and areas with highly permeable soils will greatly reduce the effects of animal feed operations on area waters.
- Nutrient Management.** Excessive amounts of nutrients, namely phosphorus and nitrogen, contaminate groundwater and create nuisance algae presence in area waters. Major contributors are cropland, urban grasses, municipal wastewater, aging or non-compliant septic systems, and internal cycling.
- Wetland Management.** Due to the historical draining of much of the areas wetlands and homogenic agricultural practices, priority is given to both wetland preservation and restoration. Wetlands that have been filled and drained retain their characteristic soil and hydrology, often allowing their natural functions to be reclaimed. Restoration is a complex process requiring planning, implementation, monitoring, and management.

NRI Soil Loss Estimates ¹³

- NRI estimates for sheet and rill erosion by water on the cropland and pastureland **increased** by approximately 1,743,900 tons (141%) of soil between 1982 and 1997.
- NRI estimates for wind erosion were not available for the 1982, 1987, and 1992 reporting periods. Wind erosion in 1997 was estimated at 1,421,400 tons.



Watershed Projects, Plans and Monitoring

- **Agricultural Land Buffer Incentive Program**
Minnesota Department of Agriculture
- **Basin Alliance for the Lower Mississippi in MN**
(BALMM)
- **Driftless Area Restoration Effort**
Trout Unlimited, US Fish and Wildlife Service
- **Driftless Area Initiative**
DAI, NRCS, FSA, FWS, Forest Service, State DNRs
- **EPA Targeted Watersheds Grant Project**
US EPA, Vermillion River Joint Powers Board
- **Lower Whitewater River PL-566**
NRCS, Whitewater JPB, Wabasha & Winona SWCD
- **Lower Mississippi Regional TMDL Plan**
MN Pollution Control Agency
- **Middle Fork Whitewater River PL-566**
NRCS, Whitewater JPB, Wabasha & Winona SWCD
- **Mississippi River Basin W.Q. Plan**
Minnesota Pollution Control Agency
- **Mississippi River Env. Management Program**
US Army Corps of Engineers
- **Mississippi Source Water Protection Project**
Minnesota Department of Health
- **Mississippi River WS Forest Partnership**
USDA Forest Service
- **Mississippi River Watershed Fund**
USDA Forest Service / National Fish & Wildlife Federation
- **North Fork Whitewater River PL-566**
NRCS, Whitewater JPB, Wabasha & Winona SWCD
- **SE MN Coldwater Resources Management Plan**
Minnesota Department of Natural Resources
- **South Fork Whitewater River PL-566**
NRCS, Whitewater JPB, Wabasha & Winona SWCD
- **Southeast Minnesota Wastewater Initiative**
U of M, MPCA, BALMM
- **South Branch Whitewater River Watershed CWP**
MPCA, Winona County, Whitewater JPB

Conservation Districts, Organizations & Partners

- **Basin Alliance for the Lower Mississippi in MN**
18 Wood Lake Drive SE Rochester, MN 55904
Phone (507) 280-3592
- **Driftless Area Initiative**
150 West Alona Lane Lancaster, WI 53813
Phone (608) 723-6377 ext.135
- **Hiawatha Valley RC&D**
1485 Industrial Drive NW Rochester, MN 55901
Phone (507) 282-6153
- **Minnesota Department of Natural Resources**
500 Lafayette Road St. Paul, MN 55155-4040
Phone (651) 296-6157
- **Minnesota NRCS - USDA**
375 Jackson Street, Suite 600 St Paul, MN 55101
On the Web: www.mn.nrcs.usda.gov
- **Olmsted County SWCD**
1485 Industrial Dr # 102, Rochester, MN 55901
Phone (507) 280-2850
- **Southeast Minnesota Wastewater Initiative**
863 30th Ave SE Rochester, MN 55904
Phone (507) 280-5575
- **Trout Unlimited Hiawatha Chapter**
Web: <http://www.mntu.org/index.php>
Phone (507) 287-6101
- **Whitewater River Watershed Joint Powers Org.**
PO Box 39, Lewiston, MN 55952
Phone (507) 523-2171
- **Wabasha County SWCD**
611 Broadway Ave Ste 10, Wabasha, MN 55981
Phone (651) 565-4673
- **Whitewater River Watershed Project**
400 Wilson St. P.O. Box 39 Lewiston, MN 55952
<http://www.whitewaterwatershed.org/>
- **Winona County SWCD**
PO Box 39, Lewiston, MN 55952
Phone (507) 523-2171
- **Wisconsin Department of Natural Resources**
101 S Webster St Box 7921 Madison, WI 53707
Phone (608) 266-2621
- **Wisconsin NRCS - USDA**
8030 Excelsior Drive Madison, WI 53717-2906
On the Web: www.wi.nrcs.usda.gov

Footnotes / Bibliography

1. Ownership Layer – Source: MN Stewardship Data: Minnesota Department of Natural Resources, Section of Wildlife, BRW, Inc, 2007. This is the complete GAP Stewardship database containing land ownership information for the entire state of Minnesota. Date of source material is variable and ranges from 1976 to 2007, although a date range of 1983 to 1985 predominates. Land interest is expressed only when some organization owns or administers more than 50% of a forty except where DNR could create sub-forty accuracy polygons.
2. National Land Cover Dataset (NLCD) - Originator: U.S. Geological Survey (USGS); Publication date: 19990631; Title: Minnesota Land Cover Data Set, Edition: 1; Geospatial data presentation form: Raster digital data; Publisher: U.S. Geological Survey, Sioux Falls, SD, USA.
3. Ownership layer classes grouped to calculate Public ownership vs. Private and Tribal ownership by Minnesota NRCS Rapid Watershed Assessment Staff. Land cover / Land use data was then extracted from the National Landcover Dataset Classification System and related to ownership class polygons.
4. U.S. Geological Survey National Hydrography Dataset (NHD) 1:100,000-scale Digital Line Graph (DLG) medium resolution hydrography data, integrated with reach-related information from the U.S. Environmental Protection Agency Reach File Version 3.0 (RF3). The Hydro 100k layer was compared to MPCA's 303(d) data to derive percentage of listed waters.
5. Land Cover / Land Use / Hydro 100k Buffer. Using the 100k Hydrology dataset, All streams within HUC were spatially buffered to a distance of 100 ft. National Landcover Dataset attributes were extracted for the spatial buffer to demonstrate the vegetation and landuse in vulnerable areas adjacent to waterways.
6. Land Capability Class. ESTIMATES FROM THE 1997 NRI DATABASE (REVISED DECEMBER 2000) REPLACE ALL PREVIOUS REPORTS AND ESTIMATES. Comparisons made using data published for the 1982, 1987, or 1992 NRI may produce erroneous results. This is because of changes in statistical estimation protocols and because all data collected prior to 1997 were simultaneously reviewed (edited) as 1997 NRI data were collected. All definitions are available in the glossary. In addition, this December 2000 revision of the 1997 NRI data updates information released in December 1999 and corrects a computer error discovered in March 2000. For more information: <http://www.nrcs.usda.gov/technical/NRI/>
7. 1997 NRI Irrigated Land Estimates. Irrigated land: Land that shows evidence of being irrigated during the year of the inventory or during two or more years out of the last four years. Water is supplied to crops by ditches, pipes, or other conduits. Water spreading is not considered irrigation; it is recorded as a conservation practice. [NRI-97] For more information: <http://www.nrcs.usda.gov/technical/NRI/>
8. 303(d) Stream data. Minnesota's Final Impaired Waters (per Section 303(d) Clean Water Act), 2006. Data obtained from Minnesota Pollution Control Agency (MPCA). The Minnesota Pollution Control Agency (MPCA) helps protect state water by monitoring quality, setting standards and controlling inputs through the development of TMDL plans. <http://www.pca.state.mn.us/water/tmdl/index.html#maps>.

Footnotes / Bibliography (continued)

9. National Coordinated Common Resource Area (CRA) Geographic Database. A Common Resource Area (CRA) map delineation is defined as a geographical area where resource concerns, problems, or treatment needs are similar. It is considered a subdivision of an existing Major Land Resource Area (MLRA) map delineation or polygon. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographic boundaries of a Common Resource Area

10. Hobbs, H.C., 1984, Surficial geology, in Geologic atlas of Winona County, Minnesota: Minnesota Geological Survey County Atlas Series, Atlas C-2, plate 3, scale 1:100,000. Hobbs, H.C., 1988, Surficial geology, in Geologic atlas of Olmsted County, Minnesota: Minnesota Geological Survey County Atlas Series, Atlas C-3, plate 3, scale 1:100,000. Lueth, R.A., 1994, Soil survey of Winona County, Minnesota: U.S. Department of Agriculture Soil Conservation Service, 278 p. Soil Survey Geographic Database (SSURGO) Tabular and spatial data obtained from NRCS Soil Data Mart at <http://soildatamart.nrcs.gov>. Publication dates vary by county. Component and layer tables were linked to the spatial data via SDV 5.1 and ARCGIS 9.1 to derive the soil classifications presented in these examples. Addendum and publication dates vary by county.

11. Lands removed from production through farm bill programs. County enrollment derived from the following: CRP Acres: www.fsa.usda.gov/crpstorpt/07Approved/r1sumyr/mn.htm (7/30/04). CREP Acres: <http://www.bwsr.state.mn.us/easements/crep/easementssummary.html> (7/31/03). WRP Acres: NRCS (8/16/04). Data were obtained by county and adjusted by percent of HUC in the county.

12. Socioeconomic and Agricultural Census Data were taken from the U.S. Population Census, 2000 and 2002 Agricultural Census and adjusted by percent of HUC in the county or by percent of zip code area in the HUC, depending on the level of data available. Data were also taken from MPCA AFO/CAFO counts provided by county for 2005.

13. 1997 NRI Estimates for sheet and rill erosion (WEQ & USLE). The NRI estimates sheet and rill erosion together using the Universal Soil Loss Equation (USLE). The Revised Universal Soil Loss Equation (RUSLE) was not used in the 1997 NRI. RUSLE was not available for previous inventories, therefore the use of USLE was continued to preserve the trending capacity of the NRI database. Wind erosion is estimated using the Wind Erosion Equation (WEQ). For further information visit <http://www.mn.nrcs.usda.gov/technical/nri/findings/erosion.htm>

14. Federally listed endangered and threatened species counts obtained from NRCS Field Office Technical Guide, Section II, Threatened and Endangered List. <http://www.nrcs.usda.gov/Technical/efotg/>. Where listed, Essential fish habitat as established by Magnuson-Stevens Fishery Conservation and Management Act, Public Law 94-265, as amended through October 11, 1996 <http://www.nmfs.noaa.gov/sfa/magact/>

15. Watershed Projects, Plans, Monitoring. Natural Resources Conservation Service, Watershed Projects Planned and Authorized, <http://www.nrcs.usda.gov/programs/watershed/Purpose>. Additional Information on listed individual projects can be obtained from the noted parties.